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| --- | --- | --- | --- | --- | --- |
|  | | Amazon AWS | Google App Engine | Microsoft Azure | IBM Smart Business Dev. |
| focus | | Public Sector | Rapid Development and deployment  Public Cloud. | Public Cloud | Hybrid Cloud, Private and Fast |
| Infrastructure and virtualization architecture | | Uses AWS Connect and XEN Para-Virtualization Architecture. | Google Computing Engine is used as infrastructure for virtualization. More infrastructure is provided than others. | Hyper-V virtualization on Azure Compute infrastructure. Azure Express route is used. All the VMs are managed by Fabric controller. | IBM Cloud Computing Reference Architecture is used. For virtualization, IBM offers IBM WebSphere application infrastructure solutions. |
| Platforms | | IAAS | PAAS | IAAS  PAAS | IAAS |
| Persistent Storage | | EC2, Dynamo | MySQL using Cloud | AZURE SQL Database | Separated from instances or independent of services and can be bind to any service. |
| Monitoring | | Amazon Cloud Watch | Google Cloud Monitoring | Verbose, AZURE Ops | IBM Smart Cloud Monitoring |
| Load Balancing | | Elastic Load Balancing | Google compute Engine | Azure load Balancer | Elastic Load Balancing |
| Message Queues | | Single Queue | Push Queue is used to share information. | Azure Data Queue. | IBM Web Sphere, Soft layer message queue. |
| Development Tools | | AWS Management Console  AWS Toolkit for Eclipse  AWS Toolkit for Microsoft Visual Studio. | Eclipse, Netbeans,  IntellIJ, Maven, Git, Jenkins, PyCharm  Google Web Toolkit (GWT),  GAE SDK for python. | SDKs for .Net, Java, Node.js, PHP, Python, Ruby; Azure command-line interface;  AzCopy Command-Line Tool for Azure Storage;  Azure PowerShell. | IBM Domino Designer,  IBM Smart Cloud Application Services;  IBM Pure Application Systems;  IBM Workload Deployer ;  IBM Smart Cloud Provisioning. |
| Integration with other services | | Dynamo DB. S3 (Simple Storage Service) and EC2. Easily integrated with other services. | A number of API’s available like maps, contacts, calendar, etc. Integrate other familiar technologies such as Node.js, C++, Scala, Hadoop, MongoDB, Redis. | Large number of .NET services including live services. Integration with many SaaS. BizTalk Services and Hybrid Connections. | Sandbox, CRM.  Live chat, Phone. |
| Web APIs | | Yes. Available  EC2 API, Java API, etc. | Yes. Available.  Blobstore API, Mail API. | Yes. Available.  .NET web API, ASP .NET API. | Yes. Available  REST Java API. |
| Programming Framework | | .NET, Java, PHP, Python, Ruby. | Go, Java, PHP, Python. | .NET, Java, Node, PHP, Python,  Ruby. | Java, Node, Ruby. |
| Pricing | Machine CPU | 0.14 / hour | $0.10 / hour | $0.12 / hour | $0.10 / hour |
| Storage | $0.25 / GB / month | $0.18 / GB / month | $0.15 / GB / month | $0.15 / GB / month |
| I/O | $0.01 / 1000 requests | $0.02 / 1000 requests | $0.02 / 1000 requests | $0.01 / 1000 requests |
| Bandwidth | $0.10/ GB | $0.10/ GB | $0.10/ GB | $0.10/ GB |

Cloud Computing Platforms Comparison

References:

1. Amazon web services: <https://aws.amazon.com>
2. Microsoft Azure: <https://azure.microsoft.com>
3. Google App Engine: [https://**appengine**.**google**.com/](https://appengine.google.com/)
4. IBM cloud: [www.**ibm**.com/**cloud**-computing/us/en/](http://www.ibm.com/cloud-computing/us/en/)

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